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ABSTRACT

A study investigated the interrelationships among warrants, argument dimensions, and perceived argument effectiveness. Warrants were operationalized as analogies, examples, and causal warrants, while argument dimensions were defined as degree of logicality, emotionality, and ethicality. Based upon prior research, weak and strong arguments were developed using each of the three types of warrants for each of three attitudinally-different topics. Further, the influence of critical thinking instruction was examined. A total of 393 students from two major western universities were surveyed. Analyses revealed topic, warrant, and instruction effects. The research suggests implications for bases of argument perceptions and pedagogical approaches toward critical thinking instruction. One appendix containing arguments used in the study, and 35 references are attached. (Author/SG)

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WARRANTS, ARGUMENT DIMENSIONS, PERCEIVED ARGUMENT EFFECTIVENESS,
AND THE INFLUENCE OF CRITICAL THINKING INSTRUCTION

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WARRANTS, ARGUMENT DIMENSIONS, PERCEIVED ARGUMENT EFFECTIVENESS,
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Abstract

This study investigated the interrelationships among warrants, argument dimensions, and perceived argument effectiveness. Warrants were operationalized as analogies, examples, and causal warrants, while argument dimensions were defined as degree of logicality, emotionality, and ethicality. Based upon prior research, a weak and strong argument were developed using each of the three types of warrants for each of three attitudinally-different topics. Further, we examined the influence of critical thinking instruction. A total of 393 subjects were surveyed. Analyses revealed topic, warrant, and instruction effects. The implications are discussed in terms of the bases of argument perceptions and pedagogical approaches toward critical thinking instruction.

WARRANTS, ARGUMENT DIMENSIONS, PERCEIVED ARGUMENT EFFECTIVENESS,
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A considerable number of scholarly articles as well as basic texts are devoted to the subject of what constitutes a "good" argument. The existing literature on argumentation, however, is almost entirely prescriptive in nature; that is, it is aimed at instructing the would-be advocate how he or she should construct, support, and defend arguments.¹ Very little attention has been devoted to the subject of how arguments are perceived, e.g., to the way in which persons evaluate the adequacy of claims, judge the strength of grounds, or assess the quality of warrants contained in arguments they hear. Thus, Petty and Cacioppo (1986) were recently prompted to write, "one of the least researched and least understood questions in the psychology of persuasion is: What makes an argument persuasive?" (p. 31). Benoit (1987) has also underscored this point, noting that "while considerable attention has been focused on message factors such as evidence and language variables . . . the impact of message arguments has only begun to receive the attention it deserves" (p. 182).

Moreover, even less attention has been paid to whether the completion of a basic course in critical thinking or argumentation produces noticeable changes in the way persons evaluate the quality or strength of the reasons offered by an advocate. Since the avowed purpose of such courses is to impart argumentation skill or enhance critical thinking ability, one would anticipate that the completion of such courses would produce significant, measurable changes in the way individuals process arguments. At present, however, it is not clearly known whether persons who have taken a basic course in critical thinking perceive or evaluate argument potency differently from those who have not.

The present authors sought to partially remedy these deficiencies in the literature by examining the relationship between instruction in critical thinking, initial attitude, type of warrant, and topic on subjects' ratings of argument strength or quality. Specifically, subjects with varying degrees of training in critical thinking were asked to assess the quality of the reasons contained in a series of arguments on one of three topics, to determine the extent to which their degree of training and initial attitudes, coupled with the type of warrant employed, influenced their evaluations of overall argument potency as measured along three dimensions. Subjects' evaluations were, in turn, compared with those of experts to determine the extent to which critical thinking instruction was likely to produce ratings consistent with those of experts.

Research Rationale

The Toulmin model (Toulmin, 1958) has long been regarded as one of the most basic, fundamental representations of a single unit of argument. According to Toulmin's typology, the portion of an argument labeled the "warrant" embodies the active reasoning employed and thereby serves to authorize an inferential leap from grounds (or data) to claim. In their original explanation and elaboration of the Toulmin model, Brockriede and Ehninger (1960) categorized warrants into three basic types: substantive (warrants based on traditional rationality, e.g., example, sign, analogy, cause-to-effect, etc.), authoritative (warrants based on ethos or source credibility), and motivational (warrants based on pathos or emotion). Toulmin, Rieke, and Janik (1978) further added that warrants could be based on beliefs, attitudes, or values held by auditors. While a great deal is known about how receivers evaluate arguments from authority (see

for example, literature reviews by Anderson & Clevenger, 1963; McCroskey & Young, 1981) and arguments based on motivational appeals, particularly fear appeals (see reviews by Higbee, 1974; Janis, 1967; Miller, 1963), very little is actually known about the manner and means by which persons evaluate substantive warrants. As Reinard (1984) has lamented, "notwithstanding that research has been completed on isolated aspects of the Toulmin system . . . a somewhat surprising dearth of empirical research exists on the application of the Toulmin system for message development" (p. 211).

We chose to focus our investigation on how individuals evaluate warrant strength on three specific types of substantive warrants: reasoning by example, reasoning by analogy, and cause-to-effect reasoning. These three warrant types were selected not only because they represent well-established, prototypical forms of substantive reasoning, but also because they are field-invariant and they appear to offer the prospect of revealing differences in the way persons understand and process warrants. For example, warrants based on analogies may be more vivid or visualizable and may therefore be processed differently than warrants based on cause-to-effect reasoning, which may be more linear or sequential. The selection of these warrant types was further justified on methodological grounds, since high reliabilities had previously been obtained for inter-expert agreement on the classification of these three warrant types (Authors, 1989).

Our interest in learning how individuals assess the potency of these three warrant types (example, analogy, and cause-to-effect) centered around the goal of discovering implicit criteria that persons use in the evaluation process. In particular, we wanted to know whether specific factors or dimensions serve as the bases for warrant evaluations. Based

on criteria drawn from traditional rationality, we selected four dimensions for analysis: a "logical" dimension based on the degree to which a warrant is seen as fallacious or cogent (hereafter referred to as "logicality"); an "emotional" dimension stemming from the extent to which a warrant is viewed as emotive or unemotive (hereafter referred to as "emotionality"); an "ethical" dimension linked to the extent to which a warrant is perceived as moral or immoral (hereafter referred to as "ethicality"); and a global "effectiveness" dimension representing the degree to which a warrant is perceived as effective, successful, or convincing. While no empirical literature on these dimensions of warrant evaluation presently exists, we believe their selection is well-grounded in traditional argumentation theory. Virtually every argumentation text contains a unit or chapter on fallacious reasoning (see for example, Kahane, 1984; McDonald, 1989; Toulmin et al., 1984), or what we have termed logicality. Similarly, many—if not all—argumentation and critical thinking texts address concerns related to the use of emotional appeals, emotive language, or "loaded" language (see Barry, 1984; Moore, McCann, & McCann, 1985; Warnick & Ince, 1989), which we have termed "emotionality." Ethical or moral criteria for reasoning also receive ample attention in traditional argumentation texts (see Church & Wilbanks, 1986; Jensen, 1981; Moore & Parker, 1986) and thereby serve as justification for what we have termed "ethicality." Overall message effectiveness is a concern addressed in every one of the preceding sources. Though no empirical research to date has explored these dimensions, the following literature review examines those few investigations that are related to the evaluation of warrants in general.

Literature Review

Reinard (1984) conducted two experiments to determine whether the elements forming the "second triad" of the Toulmin model (backing, qualifier, and rebuttal) enhanced message effectiveness as measured by attitude change. He found that the effectiveness of arguments based on the extended model depended on the degree to which the topic was viewed as ego-involving and on the particular combinations of elements of the second triad included. Messages accompanied by evidence serving as backing for the warrant were perceived as more persuasive than messages without backing for the warrant. Hence, these results suggest that receivers do appear to evaluate warrant strength or quality in some manner.

Unfortunately, no information was reported in the above investigation as to the types of warrants employed in each of the message units. Furthermore, although two topics were utilized, Reinard failed to note whether the types of warrants employed were held constant across both topics. Thus, the possibility of warrant-induced interaction effects cannot be ruled out.

While not addressing the subject of warrants specifically, Petty and Cacioppo have conducted a series of investigations on "argument quality" and "argument quantity" (Cacioppo, Petty, & Morris, 1983; Petty & Cacioppo, 1979, 1981, 1984, 1986). Their approach involves generating sets of arguments designated as "strong" or "weak" which subsequently serve as the message units for investigations related to their Elaboration Likelihood Model (ELM) of persuasion. Among the dependent measures studied by the authors are subjects' self-reports of cognitive effort, argument recall, and overall perceptions of message quality.

In one study (Petty & Cacioppo, 1984), for example, it was found that low-involved subjects were influenced more by the number of arguments contained in a message, whereas high-involved subjects were influenced

more by the quality of the arguments. These results corroborate those of an earlier study by the same authors (Petty & Cacioppo, 1979) where it was found that increasing involvement enhanced persuasion in a strong message condition but reduced persuasion in a weak message condition. In yet another investigation (Petty & Cacioppo, 1981), strong arguments were recalled significantly more often than weak arguments by subjects, independent of any involvement effects.

Clearly, the "strong" versus "weak" variable featured in the Petty and Cacioppo studies outlined above would appear to be related to the issue of warrant type. Yet, based on the examples of "strong" and "weak" arguments cited by the authors, no effort was made to systematically control for warrant type. That is, strong and weak arguments were constructed without regard to the types of warrants employed. Thus, unfortunately, it is not possible to discern from the results of any of their investigations whether warrants of a given type elicited consistently higher message quality ratings from subjects that warrants of another type. Further, none of the studies conducted by Petty and Cacioppo thus far have examined the influence of instruction in critical thinking or argumentation. A final limitation of Petty and Cacioppo's approach is that the classification of arguments as "strong" or "weak" was not independently corroborated by experts in argumentation.

Following Petty and Cacioppo's line of research, Pentony (1986) studied the relationship between involvement in an issue and subjects' perceptions of the quality of arguments. The results showed that good arguments were perceived as more persuasive than bad arguments, without regard to involvement. As with the preceding studies, Pentony's study did not control for the type of warrant used across the strong and weak

conditions, thus it is possible that one type of warrant was favored in the construction of the strong arguments, while another type of warrant was favored in the construction of the weak arguments. Neither did Pentony attempt to assess the effect of prior instruction in critical thinking on subjects' perceptions of argument quality.

Benoit (1987) examined the effects of three factors--argumentation, expertise, and attractiveness--on subjects' cognitive responses to messages. As part of the experimental procedure subjects were first exposed to strong or weak arguments, after which the number of favorable versus unfavorable thoughts elicited and the amount of attitude change produced were measured. As predicted, strong arguments produced significantly more favorable thoughts than weak arguments and significantly greater attitude change. Benoit's findings echo those of Petty and Cacioppo mentioned previously, since Benoit utilized an involving topic for all conditions.

The above study does have bearing on the question of whether receivers' estimates of warrant strength are related to warrant type, since Benoit's description of the experimental procedure suggests that generalizations were employed as the "strong" arguments in the study, whereas examples served as the "weak" arguments. However, since warrant type (generalization versus example) was not manipulated across argument strength (strong versus weak), the inference cannot be reliably drawn that "generalizations" are perceived as superior to "examples." An alternative possibility is that strong generalizations are superior to weak examples.

The above studies, while few in number, represent the available empirical literature which has a direct bearing on the subject of how persons assess the strength of substantive warrants. Regrettably, no investigations to date have sought to examine specifically what influence,

if any, warrant type may have on individuals' overall estimates of argument strength or quality. Since it appears reasonable that warrant type could have a bearing on perceived argument strength and, since the possibility also exists that one type of warrant could be systematically perceived as superior to another, efforts to reduce the current dearth of experimental research in this area would appear to be justified.

In addition to our general interest in warrant evaluation, we were also interested in the influence of critical thinking instruction on warrant evaluation. The growing interest in critical thinking pedagogy merits more rigorous attention. A brief review of the empirical literature related to critical thinking in this context would also appear to be in order. Surprisingly few studies have actually attempted to measure the effectiveness of courses in critical thinking. Those empirical studies that have been conducted have yielded inconsistent results. Thus, after conducting their own literature review in 1983, Follert and Colbert conceded that:

The result of five studies of the relationship between debate training and critical thinking were examined to determine if in fact debate training improves critical thinking skills. . . . Meta-analysis . . . indicated the results could be accounted for by chance. The results of this analysis cast substantial doubt on the claimed relationship between debate training and critical thinking improvement. (p. 1)

In addition to the above caution, it is also worth noting that the commonly used procedure of comparing experienced debaters with non-debaters may entail a self-selection bias. It is entirely possible that persons with superior critical thinking ability may be drawn to academic debate, since it affords them an opportunity to excel in an activity in which they are naturally inclined. Thus, while there is a widespread assumption that instruction in critical thinking, argumentation, or

academic debate produces changes in the way persons analyze and evaluate arguments, this conclusion has not been demonstrated unequivocally in the empirical literature. Additional efforts aimed at discerning whether instruction in critical thinking does lead to changes in the way warrants are perceived or evaluated would therefore appear to be justified.

METHODS

Sample

A total of 393 students from two major western universities participated in the study. Of these, 242 (61.6%) had taken a lower-division course in critical thinking or argumentation from one of five different instructors, while the remaining 151 (38.4%) subjects had not taken a critical thinking course and were currently enrolled in a lower-division fundamentals of communication course. Both the critical thinking and the communication fundamentals courses were general education courses that drew students from a variety of academic disciplines. In terms of the subjects' demography, the mean age was 21.5 ($sd=4.3$), 57.3% were female, 62.6% were Anglo-American, and 20.1% were Asian-American.

Questionnaire

The first task in constructing the questionnaire was to determine the argument stimulus materials. Two criteria were considered in determining the argument stimuli: (a) the topics of the arguments should vary in their attitudinal orientations and (b) the arguments should vary in terms of their warrant-type and potency. Based upon recent attitudinal surveys of college students, three topics were chosen—two controversial (pro-elective abortions and anti-capital punishment) and one neutral (hypothetical construction contract). The two controversial topics were chosen such that one would be consistent with the attitudes of most of the subjects (pro-abortion) and one would be counter to the prevailing

attitudes of the subjects (anti-capital punishment). A manipulation check included in the questionnaire affirmed that our subjects were in favor of elective abortions and capital punishment. Argument strength was assessed in an earlier study (Authors, 1989) where we surveyed 15 nationally-recognized scholars in argumentation. We presented each of the scholars with 36 arguments on one of the three topics under consideration and asked them to classify the arguments according to warrant (example, analogy, and cause-effect) and to assess the argument's potency. Arguments that had a consensus in terms of type and strength (i.e., weak vs. strong) were selected for the present study. The strong and weak arguments based upon example, analogy, and cause-effect reasoning for the three topics (abortion, capital punishment, and hypothetical building contractor) are presented in Appendix 1. These 18 arguments make up the stimulus material. In order to avoid possible fatigue effects in responding to the arguments, the arguments were separated into three groups on the basis of topic. Further, to control for any order effects two forms of the questionnaires were created for each topic by randomly ordering the presentation of the arguments. Thus, six versions of the questionnaire were constructed (three topics by two separate orderings).

The second task in the construction of the questionnaire was to determine the response set for each argument. Based upon our review of the literature on warrant types and argument strength, we decided on three dimensions of argument strength, namely, logical, emotional, and ethical dimensions. Three bipolar response items were determined for each of these dimensions. For the logical dimension, the three items were valid-invalid, rational-irrational, and logical-illogical; for the emotional dimension, vivid-dull, intense-neutral, and emotional-unemotional; for the

ethical dimension, ethical-unethical, right-wrong, and moral-immoral. Further, we also created a global measure of argument effectiveness which included three items, convincing-unconvincing, persuasive-unpersuasive, and effective-ineffective. For these four scales--logicality, emotionality, ethicality, and argument effectiveness--the item reliabilities were acceptable (Cronbach's alphas = .91, .73, .88, and .92, respectively).

RESULTS

Perceptions of Weak Arguments

The first analysis we computed was that of the effects of warrant type, topic, and critical thinking instruction on perceptions of arguments that were judged weak by experts in argumentation (cf. Authors, 1989). An analysis of covariance was computed for each of the four scales--effectiveness, logic, emotionality, and ethicality--covarying out (i.e., controlling for) subject's attitude toward the topic.

For the argument effectiveness scale, significant differences were found for topic ($F=49.7$, $df=2/1149$, $p<.001$) and for course instruction ($F=5.3$, $df=1/1149$, $p<.02$). In regards to topic differences, subjects were most accurate in detecting the weaknesses in the building contractor arguments and least accurate in detecting the weakness in the pro-abortion arguments. The difference for course instruction indicated that students who had taken a beginning argumentation course were more accurate in detecting argument weaknesses. Further, two significant interaction effects were discerned: topic by warrant ($F=67.2$, $df=4/1149$, $p<.001$) and warrant by course ($F=4.2$, $df=2/1149$, $p<.02$). In terms of the topic by warrant interaction, subjects seemed least able to detect weaknesses in the causal arguments on the pro-abortion topic, but most adept at detecting weaknesses in the example arguments on the anti-capital

punishment topic. The warrant by course interaction revealed that subjects who had instruction in critical thinking were better able to detect weakness in the example and analogy arguments than the subjects who had no critical thinking instruction.

Analysis of covariance of the logic scale revealed significant differences for topic ($F=55.4$, $df=2/1149$, $p<.001$), warrant ($F=4.1$, $df=2/1149$, $p<.02$), and course instruction ($F=9.7$, $df=1/1149$, $p<.002$). The topic difference revealed that subjects were better able to detect logic weaknesses in building contractor arguments. The warrant difference indicated that subjects were least able to detect logic weaknesses in the causal arguments. Course instruction in critical thinking improved the subjects' ability to detect logic weaknesses. Further, two significant interaction effects were discerned: topic by warrant ($F=58.1$, $df=4/1149$, $p<.001$) and warrant by course ($F=3.1$, $df=2/1149$, $p<.05$). The topic by warrant interaction revealed that subjects were most adept at detecting logic weaknesses in the causal arguments on the building contractor, while least capable at detecting logic weaknesses in the example arguments in favor of abortions. The warrant by course interaction indicated that subjects who had taken a course in critical thinking were more adept at detecting logic weaknesses in the example and analogy arguments than subjects who had not taken coursework in critical thinking.

An analysis of covariance of the emotionality scale indicated two significant main effects, namely, topic ($F=10.3$, $df=2/1149$, $p<.001$) and warrant ($F=11.2$, $df=2/1149$, $p<.001$). The significant effect for topic indicated that the greatest emotionality was perceived in the weak arguments against capital punishment and the least emotionality was perceived in the weak arguments in favor of abortions. The main effect

for warrant revealed that the greatest emotionality was perceived in example-based warrants. Only one interaction effect was found: topic by warrant ($F=32.5$, $df=4/1149$, $p<.001$), suggesting that the greatest amount of emotionality was found in the example arguments against capital punishment and the least amount of emotionality was found in the causal arguments for elective abortions.

Analysis of covariance of the ethicality scale revealed only one significant main effect, namely, topic ($F=73.7$, $df=2/1149$, $p<.001$), indicating that the least ethicality was perceived in the weak arguments for abortion. Further, only one significant interaction effect was found: topic by warrant ($F=53.3$, $df=4/1149$, $p<.001$), which was based upon the perceptions of low ethicality for the example arguments for abortion and high ethicality for the causal arguments against capital punishment.

Perceptions of Strong Arguments

The second analysis we computed was that of the effects of warrant type, topic, and critical thinking instruction on perceptions of arguments that were judged strong by experts in argumentation (cf. Authors, 1989). An analysis of covariance was computed for each of the four scales--effectiveness, logic, emotionality, and ethicality--covarying out (i.e., controlling for) subject's attitude toward the topic.

An analysis of covariance for argument effectiveness revealed only one significant difference: topic ($F=106.6$, $df=2/1148$, $p<.001$), indicating that the strong arguments in favor of abortions were perceived the most effective, while the strong arguments against capital punishment were perceived as the least effective. Also, only one significant interaction effect was found, namely, topic by warrant ($F=10.8$, $df=4/1148$, $p<.001$), revealing that the most effective argument was the causal one in favor of elective abortions, while the least effective argument was the

analogy against capital punishment.

Three significant differences were found in the analysis of covariance of the logic scale for the strong arguments: topic ($F=82.6$, $df=2/1148$, $p<.001$), warrant ($F=6.1$, $df=2/1148$, $p<.002$), and coursework in argumentation or critical thinking ($F=4.8$, $df=1/1148$, $p<.03$). The topical differences were due to the more favorable ratings of the logic of the strong arguments in favor of abortions and to the less favorable ratings of the logic of the strong arguments against capital punishment. The warrant differences were primarily due to the favorable ratings of the the logic of causal arguments. Finally, students who had taken a critical thinking course perceived the logic of the strong arguments as less compelling. Besides these main effects, only one interaction effect was found: topic by warrant ($F=8.2$, $df=4/1148$, $p<.001$), noting that perceived logic of the causal argument in favor of abortions was rated highest, while the perceived logic of the analogy against capital punishment was rated lowest.

Two significant differences were found for the analysis of convariance for emotionality: topic ($F=101.0$, $df=2/1148$, $p<.001$) and warrant ($F=4.4$, $df=2/1148$, $p<.02$). In terms of the topic differences, the greatest emotionality was attributed to the abortion arguments and the least emotionality was attributed to the contractor arguments. Example warrants were thought to exhibit the greatest emotionality, while the analogy warrants were thought to exhibit the least emotionality. Further, one significant interaction effect was found: topic by warrant ($F=19.3$, $df=4/1148$, $p<.001$), indicating that the greatest emotionality was in the example warrant in favor of abortions, while the least emotionality was perceived in the causal warrant regarding the building contractor.

An analysis of covariance for the ethicality scale for the strong arguments indicated significant differences for topic ($F=46.3$, $df=2/1149$, $p<.001$), warrant ($F=6.0$, $df=2/1149$, $p<.003$), and critical thinking instruction ($F=7.0$, $df=1/1149$, $p<.01$). An analysis of the means for these variables revealed that topical differences were due to greater perceived ethicality for the abortion topic and less perceived ethicality for the capital punishment topic. Causal warrants were perceived as having greater ethicality, while analogy warrants were perceived as having less ethicality. In terms of the course effects, students who had instruction in critical thinking perceived less ethicality in the strong arguments than did students without critical thinking instruction.

Argument Dimensions and Perceived Effectiveness

A stepwise multiple regression analysis was computed on the three argument dimensions (logicality, ethicality, emotionality) and the global construct of argument effectiveness for those who have had a course in critical thinking and for those who have not had a course in critical thinking. For those subjects who had taken a critical thinking course, two argument dimensions emerged as significant predictors of argument effectiveness, namely, logic and emotionality (betas=.83 and .15, respectively, $R^2=.84$). For those subjects who had not taken a critical thinking course, all three argument dimensions emerged as significant predictors of argument effectiveness, namely, logic, emotionality, and ethicality (betas=.73, .21, and .07, respectively, $R^2=.81$). Thus, the multiple regressions reveal that in assessing argument effectiveness subjects who had critical thinking courses relied more on the logic of the argument, while subjects who had not had critical thinking instruction included more of the dimensions of emotionality and ethicality in their judgements.

DISCUSSION

This research reveals a number of interesting results both in terms of how individuals evaluate arguments, and how such evaluations are affected by instruction in beginning argumentation/critical thinking courses. While there appears to be a general model of argument assessment, precise evaluations of arguments are affected by both type of warrant employed and by the topic of the argument. Further, instruction in critical thinking alters how an individual assesses arguments.

Assessment of Arguments

In general, subjects appear to evaluate argument effectiveness primarily in terms of the posited dimensions of logicity, emotionality and ethicality. The scales developed to measure these dimensions achieved high internal reliability. Further, since approximately four-fifths of the variance in argument strength was explained by these dimensions, a high level of predictive validity is suggested. While the basic areas of argument assessment appear to be logicity, emotionality, and ethicality, logicity is perceived as the most potent force in assessing argument strength while emotionality and ethicality serve lesser roles.

Although there seem to be basic dimensions of argument assessment, an individual's evaluation of a specific argument is influenced by a number of factors. The first of these is the type of warrant employed in the argument. Even though we tried to control warrant strength, we did find some differences based on types of warrants. No one warrant type consistently produced arguments which were perceived as most effective. However, subjects were least accurate in detecting logical weaknesses in causal arguments and perceived the logic of causal arguments to be the strongest. This is consistent with the emphasis our culture

places on science and causation (Glenn, Witmeyer, & Stevenson, 1977; Kaplan, 1964; Kuhn, 1970).

Warrant type also influences the perceived emotionality of arguments. For both strong and weak arguments the greatest emotionality was perceived in example-based arguments. For strong arguments, the least emotionality was perceived in analogies. This probably reflects the fact that examples are personalized. Thus it was easier for subjects to empathize with emotional considerations in such arguments. While analogies can be visualized, they lack the strong emotional ties of the personal example because they require a higher order association. This result seems consistent with the advice often given in public speaking texts to use examples to "personalize" one's message (Campbell, 1982; Samovar & Mills, 1983, pp. 96-100).

While perceptions of the ethicality of arguments appeared to be less influenced by warrant type, subjects did report that with strong arguments causal warrants were perceived as most ethical while analogy warrants were perceived as least ethical. This is probably a function of social values. Recent events in both government and business have created a strong demand for "ethical behavior." Combined with our esteem of science and causation, arguments employing this mode appear to best support this value. The above results appear to indicate that the type of warrant one employs in an argument can influence how the auditor perceives that argument. Perceptions of the logicality and ethicality of arguments are enhanced by employing causal warrants while the emotional value of arguments is most impacted through the use of examples.

Consideration of the effects of topic on assessments of arguments revealed that subjects' evaluations of arguments are affected by attitu-

dinal valence and familiarity. Despite our attempts to statistically control for attitudinal valence, it is apparent that people assess arguments with which they agree differently than those with which they disagree or are unfamiliar. Subjects were most accurate in identifying the overall weaknesses and logical weaknesses in unfamiliar arguments (contractor topic) and least accurate in identifying the overall weaknesses in attitude-consistent arguments (pro-choice abortion topic), especially those with causal warrants. Subjects perceived the greatest overall strength and logical strength in attitude-consistent arguments and the least overall strength and logical strength in counter-attitudinal arguments. They also perceived the logic of the causal arguments in favor of abortion to be the strongest while the logic of the analogies opposed to capital punishment was seen as the weakest.

Two primary factors would appear to explain these results. First, the results are consistent with much of the persuasion research which indicates that we favor arguments which are consistent with our attitudes and disfavor arguments which are inconsistent with our attitudes. We see attitude-consistent arguments as stronger and attitude inconsistent arguments as weaker (Feathers, 1964; Harte, 1971; Lefford, 1946; Miller, 1969). Thus, attitudinal valence decreases our ability to accurately evaluate argument strength.

The second factor affecting these results would appear to be lack of familiarity. Subjects had already formed opinions on both the capital punishment and abortion topics and thus were undoubtedly familiar with the arguments surrounding these controversies. However, the contractor topic was one unfamiliar to the subjects, and they began this study with neutral attitudes toward the topic. In essence, for familiar topics, subjects could respond reflexively, but for the unfamiliar topic they had to

respond reflectively--individually considering each argument. Consequently, on the attitude-neutral topic, their assessments were less influenced by attitudinal predispositions.

Subjects' perceptions of the emotionality of arguments also may have been affected by their attitudinal predispositions. In terms of weak arguments, those opposed to capital punishment were perceived as more emotional, with examples being the most emotional, while arguments in favor of abortion by choice were perceived as less emotional with causal arguments being the least emotional. On the other hand, for strong arguments those on the contractor topic were perceived as less emotional, with causal arguments being the least emotional, while those favoring abortion were perceived as more emotional, with examples being the most emotional. It may be that the emotionality of arguments could be negative (usually in regards to weak, counterattitudinal arguments) or positive (usually in regards to strong, pro-attitudinal arguments) in terms of individuals' global ratings of argument effectiveness.

Perceptions of the ethicality of arguments also yielded heuristic results. For the weak arguments, those perceived as less ethical were on the abortion topic, examples being the least ethical, while causal arguments for capital punishment were the most ethical. For the strong arguments, those perceived as most ethical favored abortion by choice and those perceived as least ethical opposed capital punishment. Again, attitudinal predispositions may account for this effect. Our cultural value of ethics causes individuals to want to be seen as ethical. Consequently, they tend to see attitude-consistent arguments as ethical while attitude-inconsistent arguments are unethical.

Why then were the weak abortion arguments perceived as least ethical?

We believe this is based on the subjects' desires to dissociate themselves from weak arguments. In other words, in a subject of controversy, individuals are generally aware that there are strong and weak arguments in favor of their position and opposed to their position. However, it is most reinforcing to believe that one favors a particular position for the "right" reasons. Consequently, the weak arguments in favor of one's position are viewed negatively and as less ethical thereby distancing oneself from such arguments.

These results indicate that the subject matter of argument, as well as warrant type, influences argument assessment. Not surprisingly, for all topics, strong arguments are perceived as more effective than weak arguments. When those strong arguments are consistent with the auditors' attitudes toward the topic, they will be perceived as the strongest, most logical, most emotional and most ethical. When those strong arguments are inconsistent with the auditors' attitudes, they will be seen as least strong, least logical and least ethical. Assessments of overall strength or weakness and logic of arguments are most accurate on unfamiliar topics where the targets have formed no prior opinions. Likewise, attitude neutral strong arguments are perceived as least emotional. Finally, weak arguments which are consistent with the target's opinions generate the lowest perceptions of emotionality and ethicality probably reflecting the targets' desires to distance themselves from such "poor" arguments. It may be that a weak attitude-consistent argument is worse than no argument in providing support for one's position.

Effects of Beginning Argumentation Instruction

The results of this research indicate that instruction in beginning argumentation or critical thinking significantly alters how individuals assess arguments. Argumentation instruction enhances the student's

ability to detect argument weaknesses while at the same time causing the student to rely more on the logical dimension and less on the ethical and emotional dimensions in assessing argument strength.

The regression analyses which compared critical thinking students to noncritical thinking students indicated that such instruction fundamentally affects the dimensions by which students evaluate arguments. While the amount of variance explained in argument effectiveness was not markedly different in the two conditions, the factors explaining this variance were different. For the students who had not received instruction in argumentation, argument effectiveness was influenced by the perceived logicity, emotionality and ethicality of the argument. However, for the students who had received beginning argumentation instruction, only perceived logicity and emotionality influenced perceptions of argument strength. Moreover, logicity played a much larger role (betas .83 vs. .73), and emotionality a much smaller role (betas .15 vs. .21) in such assessments. In other words, instruction in critical thinking appears to cause the student to emphasize the logical dimension of an argument at the expense of emotion and ethics in assessing arguments.

While we did not find this increased emphasis on logic surprising, we do think that the decreased emphasis on emotion and ethics has implications for instruction in critical thinking. To the extent that such courses purport to increase the student's ability to advocate a position, students need to be aware that general audiences rely on more than logic in assessing arguments. The emotional and ethical power of arguments are also a potent force for the general auditor.

A second concern lies in the decreased emphasis on ethicality of

arguments. Does this mean that such courses emphasize logic at the expense of ethics? Is that the pedagogical goal such courses want to achieve? We suspect that it is not and that beginning argumentation courses ought to consider giving greater emphasis to ethical considerations in argument.

In addition to affecting the overall dimensions of argument evaluation, instruction in critical thinking also alters the evaluation of specific arguments in a number of ways. For weak arguments, students who had received instruction in critical thinking were better able to detect overall argument weaknesses and logical weaknesses. These effects were particularly pronounced in arguments based on examples and analogies. Thus, critical thinking instruction appears to hone a student's ability to detect argument defects.

For strong arguments, instruction in critical thinking also altered student's evaluations of arguments. Argumentation students perceived the strong arguments to be both less logical and less ethical than did nonargumentation students. In essence, critical thinking students were overcritical of good arguments. We suspect that this reflects a tendency to emphasize fallacies and argument defects in such courses. For example, one major western university system which requires a critical thinking course for general education specifically dictates that students shall receive instruction in fallacies of argument. As a consequence, students tend to focus on what is wrong with arguments rather than what is right with arguments. From a pedagogical standpoint this suggests that teachers of beginning argumentation should also stress recognizing argument strengths as well as weaknesses.

In summary, critical thinking instruction results in students giving more emphasis to the logical dimension and less emphasis to the emotional

and ethical dimensions in evaluating arguments. Further, argumentation students are not only more accurate at isolating overall argument weaknesses and logical weaknesses but also tend to view strong arguments as less logical and less ethical than nonargumentation students. Clearly then, instruction in critical thinking does affect one's assessment of arguments.

Implications and Future Directions

This research has created a scale for assessing the dimensions of substantive argument evaluation. However, it was limited to three kinds of substantive arguments: cause, example, and analogy. Future research ought to expand the types of substantive arguments (e.g., sign) and also ought to consider the applicability of the scale to arguments based on motivational and authoritative warrants. Through such an approach we can ultimately gain a comprehensive view of how arguments are evaluated.

This research has also begun to explore how warrant type and topic affect argument assessment. Future research in this direction also should expand the types of warrants used. Analysis of different topics, using the attitude-consistent, attitude-inconsistent, and attitude-neutral mode could also give more confidence to the effects of attitude valence on argument evaluation.

Finally, this research confirms that instruction in critical thinking affects the assessment of arguments. While such instruction has the benefit of increasing accuracy in identifying argument weaknesses, it also causes students to become overly critical of arguments. This suggests that such courses should emphasize what makes good arguments as well as what makes bad arguments. Further, beginning argumentation instruction causes students to emphasize logic and deemphasize emotion and ethics in

evaluating arguments. Students need to be informed that general audiences evaluate arguments differently. Further, consideration should be given to whether this is the desired effect which we want to achieve in critical thinking courses.

Footnotes

¹We refer here to traditional argumentation and debate literature and not to the more recent literature on interpersonal arguments or the conversational analysis of arguments. While interrelated, the two bodies of literature are sufficiently distinct in that the former focuses upon argument, while the latter focuses upon argument.

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APPENDIX 1

Arguments Used in the Study

Capital Punishment

Capital punishment should be outlawed because there are inequities in imposing the death sentence from state to state. For example, a young black convicted of a murder during a robbery in Texas was executed, whereas if he had committed the same crime in New York he would have received 15 years to life. (Example, Strong)

The senselessness of capital punishment is illustrated by the heroic deed of one prisoner who was sentenced to die. While on death row awaiting execution, this prisoner saved the life of a prison guard who was being attacked by several other inmates. (Example, Weak)

Capital punishment is wrong because it requires society to repeat the murderer's offense. It makes no more sense to execute murderers for the crime of murder than it does to rape rapists or beat up muggers as punishments for their respective crimes. (Analogy, Strong)

Capital punishment should be abolished because a human life is too precious to waste. To execute a murderer without making every effort at rehabilitation is analogous to junking an automobile merely because it has a flat tire. (Analogy, Weak)

Capital punishment is counterproductive because it causes our society as a whole to become more violent. The existence of state-sanctioned executions "teaches" citizens that violence and murder are acceptable means of resolving social conflicts. (Causal, Strong)

Capital punishment is inequitable because the very nature of the jury selection process biases the outcome in favor of executions. The fact that jurors must be "death qualified" (i.e., be in favor of the death penalty in order to serve as jurors in capital cases) predisposes juries toward recommending the death sentence. (Causal, Weak)

Elective Abortions

Abortions must be legally obtainable, or some women will simply resort to obtaining illegal--and far more dangerous--"back alley" abortions. For example, before abortions were essentially legalized in 1973, a New York city woman attempted to perform an abortion on herself, but due to complications, she began hemorrhaging and eventually bled to death. (Example, Strong)

Elective abortions are necessary if parents are to exercise control over the biological sex of their children. For example, one couple that already had two girls sought an abortion when they learned the wife was pregnant with what would have been their third girl. (Example, Weak)

APPENDIX 1 (continued)

The right to abortion must be tolerated because women must be allowed to control their own bodies. Just as our nation recognized the rights of blacks to control their own bodies by emancipating slaves, women must also govern the right to control their own bodies, even if such control involves the choice of obtaining an abortion. (Analogy, Strong)

A woman who does not feel she can be a good mother should not be forced to bear a child. Just as a mother bird on occasion pushes an egg out of the nest, knowing that she cannot care for the chick, so too a pregnant woman should have the right to terminate her pregnancy if she knows she cannot care for the baby. (Analogy, Weak)

Abortions should be legally obtainable because if they are not, thousands of women per year would be forced to seek illegal "back alley" abortions. The result would be that many women would die from unsterile surgical conditions, lack of qualified medical personnel, or medical complications arising from the procedure. (Causal, Strong)

Elective abortions must continue to be legal because outlawing abortion would result in the unemployment of doctors and nurses. Since thousands of health care professionals make their living performing abortions, legal restrictions would cause these health care workers to lose their jobs. (Causal, Weak)

Construction Contract

We should hire contractor C because he is a very creative designer. For example, the shopping center he designed two years ago in Palo Alto won a "Design Award." (Example, Strong)

Contractor F should be chosen because he gave the best presentation. For example, he was the only one to use color slides, and his charts and diagrams looked like they had been professionally done. (Example, Weak)

It would be unwise to select Contractor D because he has a reputation for substituting used materials and claiming they are new. That kind of practice is analogous to Chrysler's recent attempt to sell cars as "new" when, in fact, the odometers had been set back. (Analogy, Strong)

We should select Contractor B since he graduated from this university. That makes him more like "family" and the other contractors more like "strangers." (Analogy, Weak)

We shouldn't hire Contractor A because he would cost us a lot more than his bid. His plans don't really meet our needs, so that would cause increased costs due to design revisions. (Causal, Strong)

We should seriously consider Contractor E because he'd be fun to work with. He's got a "happy go lucky" personality which causes people to want to be around him. (Causal, Weak)